AMENDMENTS TO THE CLAIMS

Please cancel claims 63-70 without prejudice or disclaimer, amend claims 30, 32, and 38, and add new claims 71-106 as shown in the following claim listing.

Claims 1-29 (canceled)

30. (currently amended) A hydrogen gas detector, comprising:

a light source;

a thermal energy source that is separate from the light source;

an optical filter having an optical transmissivity responsive to ~~the~~ a presence and concentration of hydrogen gas in an ambient environment to which the optical filter is exposed, said optical filter being disposed in proximity to the light source such that said optical filter is illuminated with light from the light source, and being operatively coupled to the thermal energy source such that the optical filter is heated by the thermal energy source to an elevated temperature; and

a light detector generating an output signal, the state of said output signal being proportional to the intensity of light impinging on the light detector, said light detector being disposed in light-sensing relationship to the optical filter, whereby light from the light source passing through the optical filter impinges on the light detector and generates said output signal as ~~a~~ an indication of the presence and/or concentration of hydrogen gas in the ambient environment.

31. (previously presented) The hydrogen gas detector of claim 30, wherein the light source comprises a light-generating element selected from the group consisting of incandescent bulbs, light emitting diodes, fluorescent lamps, electroluminescent lamps, and optical lasers, and optical waveguides illuminated by any such light-generating element.

32. (currently amended) The hydrogen gas detector of claim 30, wherein the thermal energy source comprises a heat-generating element ~~that is separate from the light source~~ selected from the group consisting of resistive wires, exothermic chemical reactions, ultrasonic radiation, acoustic radiation, microwave radiation, and laser radiation.

Claims 33-34 (canceled)

35. (original) The hydrogen gas detector of claim 30, wherein the light detector comprises a light detection element selected from the group consisting of photodiodes, avalanche photodiodes, phototubes, photomultiplier tubes, microchannel plates, solar cells, image intensifiers, photoconductor detectors, charge-coupled devices, and combinations or arrays thereof.

36. (original) The hydrogen gas detector of claim 30, wherein the optical filter comprises a rare earth metal thin film deposited on an optical output surface of the light source.

37. (original) The hydrogen gas detector of claim 36, wherein the rare earth metal thin film comprises a rare earth metal component selected from the group consisting of trivalent rare earth metals reactive with hydrogen to form both metal dihydride and metal trihydride reaction products, wherein the metal dihydride and metal trihydride reaction products have differing optical transmissivity.

38. (currently amended) The hydrogen gas detector of claim 36, wherein the rare earth metal thin film comprises at least one metal selected from the group consisting of:

~~(I)~~ scandium, yttrium, lanthanum, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium, actinium, thorium, protactinium, uranium, neptunium, plutonium, americium, curium, berkelium, californium, einsteinium, fermium, mendelevium, nobelium, and lawrencium,

~~(II)~~ alloys thereof, and

~~(III)~~ alloys containing one or more of such metals alloyed with an alloying component selected from the group consisting of magnesium, calcium, barium, strontium, cobalt and iridium.

39. (original) The hydrogen gas detector of claim 36, wherein the rare earth metal thin film comprises yttrium.

40. (original) The hydrogen gas detector of claim 36, wherein the rare earth metal thin film is overlaid by a hydrogen-permeable material comprising a metal selected from the group consisting of Pd, Pt, Ir, Ag, Au, Ni, Co, and alloys thereof.

41. (original) The hydrogen gas detector of claim 36, wherein the rare earth metal thin film is overlaid in sections by a plurality of hydrogen-permeable material, each comprising a metal selected from the group consisting of Pd, Pt, Ir, Ag, Au, Ni, Co, and alloys thereof, wherein each overlay section exhibits a unique permeability to hydrogen.

42. (original) The hydrogen gas detector of claim 36, wherein the rare earth metal thin film is overlaid by a hydrogen-permeable material that is doped with a dopant selected from the group consisting of Mg, Ca, Al, Ir, Ni and Co.

43. (original) The hydrogen gas detector of claim 36, wherein the rare earth metal thin film is overlaid in sections by a plurality of hydrogen-permeable materials, each of which is doped with a dopant selected from the group consisting of Mg, Ca, Al, Ir, Ni and Co, wherein each overlay section exhibits a unique permeability to hydrogen.

44. (original) The hydrogen gas detector of claim 36, wherein the rare earth metal thin film is overlaid by a thin film of a material including a metal selected from the group consisting of palladium, platinum, and iridium.

45. (previously presented) A hydrogen detection system for monitoring an extended or remote area region for the incursion or generation of hydrogen therein, said hydrogen detection system comprising a multiplicity of hydrogen gas detectors as in claim 30, each of which is arranged for exposure to a specific individual locus of the extended area region.

Claims 46-70 (canceled)

71. (new) The hydrogen gas detector of claim 30, wherein the optical filter is to increase its transmission of light in response to a presence of hydrogen.

72. (new) The hydrogen gas detector of claim 30, wherein the optical filter comprises a rare earth metal.

73. (new) The hydrogen gas detector of claim 30, wherein the optical filter comprises a layer of material having an optical transmissivity responsive to hydrogen deposited over a roughened substrate.

74. (new) The hydrogen gas detector of claim 30, wherein the optical filter comprises a protective layer.

75. (new) An apparatus comprising:

a light source having an output surface;

an optical filter formed over the output surface of the light source, the optical filter comprising material having an optical transmissivity responsive to hydrogen; and

an optical detector to detect light passing through the optical filter from the light source.

76. (new) The apparatus of claim 75, wherein the optical filter is to increase its transmission of light in response to a presence of hydrogen.

77. (new) The apparatus of claim 75, comprising a thermal energy source to heat the optical filter.

78. (new) The apparatus of claim 75, wherein the light source is to heat the optical filter to an elevated temperature.

79. (new) The apparatus of claim 75, wherein the light source comprises an incandescent lamp.

80. (new) The apparatus of claim 75, wherein the light source has a bulb having the output surface.

81. (new) The apparatus of claim 75, comprising an output module to signal a presence of hydrogen.

82. (new) The apparatus of claim 75, comprising an output module to signal a concentration of hydrogen.

83. (new) The apparatus of claim 75, wherein the material having an optical transmissivity responsive to hydrogen comprises a rare earth metal.

84. (new) The apparatus of claim 75, wherein the material having an optical transmissivity responsive to hydrogen comprises at least one metal selected from the group consisting of yttrium, lanthanum, and gadolinium.

85. (new) The apparatus of claim 75, wherein the material having an optical transmissivity responsive to hydrogen is formed over a roughened output surface of the light source.

86. (new) The apparatus of claim 85, wherein the output surface of the light source is roughened by a method selected from the group consisting of mechanical roughening, chemical roughening, and deposition of an underlayer.

87. (new) The apparatus of claim 75, wherein the optical filter comprises a protective layer formed over material having an optical transmissivity responsive to hydrogen.

88. (new) The apparatus of claim 87, wherein the protective layer is to protect material having an optical transmissivity responsive to hydrogen from oxidizing species.

89. (new) The apparatus of claim 87, wherein the protective layer comprises a noble metal.

90. (new) The apparatus of claim 75, wherein the optical detector is to detect light passing through a first section of the optical filter; and

wherein the apparatus comprises another optical detector to detect light passing through a second section of the optical filter.

91. (new) The apparatus of claim 75, wherein the optical filter comprises a first layer having a first permeability to hydrogen formed over a first section of material having an optical transmissivity responsive to hydrogen and a second layer having a second permeability to hydrogen formed over a second section of material having an optical transmissivity responsive to hydrogen, wherein the first permeability to hydrogen is higher than the second permeability to hydrogen.

92. (new) An apparatus comprising:

an incandescent lamp having a bulb; and

an optical filter formed over an outer surface of the bulb, the optical filter comprising material having an optical transmissivity responsive to hydrogen.

93. (new) The apparatus of claim 92, wherein the material having an optical transmissivity responsive to hydrogen comprises a rare earth metal.

94. (new) The apparatus of claim 92, wherein the material having an optical transmissivity responsive to hydrogen is formed over a roughened outer surface of the bulb.

95. (new) The apparatus of claim 92, wherein the optical filter comprises a protective layer formed over material having an optical transmissivity responsive to hydrogen.

96. (new) The apparatus of claim 92, wherein the optical filter comprises a first layer having a first permeability to hydrogen formed over a first section of material having an optical transmissivity responsive to hydrogen and a second layer having a second permeability to hydrogen formed over a second section of material having an optical transmissivity responsive to hydrogen, wherein the first permeability to hydrogen is higher than the second permeability to hydrogen.

97. (new) A method comprising:

forming over an output surface of a light source a layer of material having an optical transmissivity responsive to hydrogen; and

positioning an optical detector to detect light passing through the layer of material having an optical transmissivity responsive to hydrogen.

98. (new) The method of claim 97, wherein the forming comprises forming a layer of material comprising a rare earth metal.

99. (new) The method of claim 97, wherein the forming comprises roughening the output surface of the light source and forming over the roughened output surface the layer of material having an optical transmissivity responsive to hydrogen.

100. (new) The method of claim 97, comprising forming a protective layer over the layer of material having an optical transmissivity responsive to hydrogen.

101. (new) The method of claim 97, wherein the positioning comprises positioning the optical detector to detect light passing through a first section of the layer of material having an optical transmissivity responsive to hydrogen; and

wherein the method comprises positioning another optical detector to detect light passing through a second section of the layer of material having an optical transmissivity responsive to hydrogen.

102. (new) The method of claim 97, comprising:

forming a first layer having a first permeability to hydrogen over a first section of the layer of material having an optical transmissivity responsive to hydrogen; and

forming a second layer having a second permeability to hydrogen over a second section of the layer of material having an optical transmissivity responsive to hydrogen,

wherein the first permeability to hydrogen is higher than the second permeability to hydrogen.

103. (new) A method comprising:

powering a light source having an output surface over which an optical filter comprising material having an optical transmissivity responsive to hydrogen is formed; and

detecting light passing through the optical filter from the light source.

104. (new) The method of claim 103, comprising heating the optical filter.

105. (new) The method of claim 103, comprising signaling a presence of hydrogen.

106. (new) The method of claim 103, wherein the detecting comprises detecting light passing through a first section of the optical filter; and

wherein the method comprises detecting light passing through a second section of the optical filter.